Remarks

Applicants respectfully request reconsideration of the present application in view of the following remarks. Claims 1-12, 48-60, 64-66, and 69-78 are pending in the application. Claims 1-12, 48-60, 64-66, and 69-78 are currently rejected. No claims have been allowed. Claims 1, 5, 48, 69, 70, and 71 are independent. With the present amendment, claims 1 and 5 have been amended.

Cited Art

The Action applies the following cited art: Puri et al., U.S. Patent No. 5,227,878 (Puri or the Puri patent); Sugimoto et al., U.S. Patent No. 5,650,829 (Sugimoto or the Sugimoto patent); Kimura et al., U.S. Patent No. 5,694,173 (Kimura or the Kimura patent); Shimoda et al., U.S. Patent No. 5,734,783 (Shimoda or the Shimoda patent); Tsukagoshi et al., U.S. Patent Application Publication No. 2002/0106025 (Tsukagoshi or the Tsukagoshi publication); and Machida, U.S. Patent No. 7,486,734 (Machida or the Machida patent).

Initialed Form 1449 Not Received

On September 10, 2008, Applicants submitted an Information Disclosure Statement listing two pages of references. Applicants have not yet received an initialed 1449 form for this IDS submission. Applicants respectfully request that the Examiner provide the initialed 1449 form for this IDS submission. See MPEP § 609 ("An information disclosure statement filed in accordance with the provisions of 37 CFR 1.97 and 37 CFR 1.98 will be considered by the examiner assigned to the application.").

Reply to the "Response to Arguments" Section in the Action

Regarding the "jointly coding" and "single variable length code" claim language (e.g., "jointly coding the value for the switch code with motion vector information ... a single variable length code represents the value for the switch code and the motion vector information, the single variable length code being selected from a variable length code table of different value combinations for the switch code and the motion vector information" as recited by claim 1), the Examiner presents two arguments.

First, the Examiner argues that Machida teaches this language, citing to Machida's

description of a variable length code at col. 5, lines 10-15, which reads as follows (emphasis added):

> The variable length code decoding means 101 *separates* and decodes a variable length code from the entered bit stream, and issues quantizing coefficient, intra/inter control signal, motion vector A, and motion vector B in macro block unit, and also writes presence or absence of decoding error in the decoding error map B 113.

Applicants respectfully disagree that this language of Machida teaches or suggests the "jointly coding…" using "a single variable length code…" language of claim 1. While the imprecise language of Machida (translated from a Japanese application), at first glance, mentions decoding "a variable length code to get elements …," this language does not mean that the entire bitstream for the macroblock (for syntax elements for coefficients, intra/inter control signal, and motion vectors) is coded with a single variable length code. Instead, as Machida states, the variable length decoder "*separates*" the variable length codes for the respective syntax elements and decodes them.

The fact that the variable length codes for the intra/inter control signal and the motion vectors A and B are *separate codes* in Machida is supported by the rest of the Machida disclosure. For example, as Machida states:

> In the variable length coding means 307, the intra/inter control signal, and motion vector A and motion vector B are also entered, *and are coded into variable length codes*. The variable length coding means 307 *multiplexes all these variable length codes*, and issues as a bit stream.

Machida, col. 8, line 67 to col. 9, lines 5 (emphasis added). As Machida clearly states, the intra/inter signal, motion vector A, and motion vector B are *coded as separate variable length codes*, which are then multiplexed in the bitstream. Therefore, when Machida is describing the corresponding "variable length code decoding means" at col. 5, lines 10-15, Machida must be decoding *separate* variable length codes.

The second argument presented by the Examiner is that it would have been obvious to one of ordinary skill in the art to use a single variable length code, citing *In re Larson*. Applicants respectfully disagree with the Examiner's application of *Larson*. In *Larson*, the court held that an integral brake drum with clamping means was obvious over the prior art's brake disk and clamp which were comprised of several parts secured together with bolts. MPEP § 2144.04, V(B). The "jointly coding…" using "a single variable length code…" language of claim 1 does

not claim merely joining two separate elements together, as was done in *Larson*. Instead, Applicants of the present application first recognized the dependence (or the correlation) between switch code and motion vector information (and, as stated in other claims, the terminal symbol as well) in certain coding scenarios. Then, instead of just joining codes for the two (or more) elements together, side-by-side (which might be somewhat similar to *Larson*), Applicants developed a single custom variable-length code for jointly coding/decoding the elements. As recited in claim 1, the variable length code table has "different value combinations for the switch code and the motion vector information." Use of a single variable-length code exploits the dependence or correlation between the elements (for switch code, motion vector information, and, for some claims, terminal symbol) to more efficiently code the values as a single variable length code. This represents a novel and non-obvious improvement over the prior art. If, instead, Applicants had merely joined separate codes side-by-side without creating a custom single variable length code, then there would have been no improvement in efficiency (similar to *Larson*, where the integrated unit operated the same as the pieces bolted together).

For at least the above reasons, Machida does not teach or suggest the "jointly coding…" using "a single variable length code…" language of claim 1, or the related language of the other independent claims. The Kimura patent and other cited references fail to remedy this deficiency of the rejections.

For the sake of completeness, Applicants will also address the specific rejections made in the Office action.

Rejections of Claims 1-3, 5-6, 11-12, 48, 51-53, 55, 69-71, and 74-78 under 35 U.S.C. § 103

In the Office action, the Examiner rejects claims 1-3, 5-6, 11-12, 48, 51-53, 55, 69-71, and 74-78 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Kimura patent. The Applicants respectfully disagree.

Claim 1

Claim 1 recites (emphasis added):

> *jointly coding the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information, the single variable length code*

being selected from a variable length code table of different value combinations
for the switch code and the motion vector information.

Regarding the amendment to claim 1, see the Application at, for example, page 10, lines 24-28.

Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claim 1.

According to claim 1, an encoder encodes a set of pixels (e.g., a block, a macroblock). As part of the encoding, the encoder determines a value for a switch code. The value for the switch code indicates whether the set of pixels is intra-coded or inter-coded. The encoder jointly codes the values for the switch code with motion vector information (e.g., for differential motion vector information) for the set of pixels. A single variable length code represents the value for the switch code and the motion vector information, where the single variable length code is selected from a variable length code table of different value combinations for the switch code and the motion vector information. For example, the variable length code table has different values combinations for <intra, MVx, MVy>, or it has different values combinations for <intra, MVx, MVy , last>. *See, e.g.*, application at 24-25 and 38-40. The encoder outputs the single variable length code in a bit stream.

The Examiner argues that Machida describes, "jointly coding the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information," as recited by claim 1. Specifically, the Examiner argues that Machida determines the value of a switch code (Machida Fig. 3, element 304 inter/intra type control signal) and values for motion vector information (Machida Fig. 3, elements 301 and 313), and then outputs a single variable length code for this information (Machida col. 8, line 64 to col. 9, line 5). Action, page 4. Applicants respectfully disagree with the Examiner's interpretation of Machida, as discussed above in the section titled, "Reply to the 'Response to Arguments' Section in the Action."

Machida describes an intra/inter coding decision (304) for a macroblock. Machida, col. 8, lines 59-64. The result of the decision (the intra/inter control signal) is input into the variable length coder (307) along with motion vectors A and B. Machida, col. 8, line 64 to col. 9, lines 3. As Machida states, "In the variable length coding means 307, the intra/inter control signal, and motion vector A and motion vector B are also entered, *and are coded into variable length codes.*

The variable length coding means 307 *multiplexes all these variable length codes*, and issues as a bit stream." Machida, col. 8, line 67 to col. 9, lines 5 (emphasis added). As Machida clearly states, the intra/inter signal, motion vector A, and motion vector B are *coded as separate variable length codes*, which are then multiplexed in the bitstream. Specifically, Machida states that the three elements are coded into variable length codes (plural), and that "all these variable length codes" (plural once again) are multiplexed into the bitstream.

Because Machida describes coding the intra/inter signal, and the two motion vectors, as separate variable length codes, Machida clearly does not teach or suggest the language of claim 1 that requires, "*jointly coding* the value for the switch code with motion vector information for the set of pixels, wherein *a single variable length code* represents the value for the switch code and the motion vector information, the single variable length code being selected from a variable length code table of different value combinations for the switch code and the motion vector information." The encoding of Machida does not jointly code the intra/inter signal, motion vector A, and motion vector B elements, and therefore the encoding of Machida does not use a single variable length code for them. Instead, Machida's encoding codes them separately and sends them in the bit stream (multiplexes "*all these variable length codes*," referring to the intra/inter signal, motion vector A, and motion vector B).

In addition, as understood by Applicants, Kimura does not teach or suggest, "jointly coding the value for the switch code with motion vector information for the set of pixels, wherein a single variable length code represents the value for the switch code and the motion vector information, the single variable length code being selected from a variable length code table of different value combinations for the switch code and the motion vector information," as recited by claim 1.

For at least the above reasons, Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claim 1. Therefore claim 1 should be in condition for allowance.

Claims 5 and 70

Claim 5 recites:

> jointly coding the value for the switch code with motion vector information for the set of pixels and with a terminal symbol indicating whether transform coefficient data is encoded for the set of pixels, wherein the jointly

coding yields an extended motion vector code that is a single variable length code representing (a) the value for the switch code, (b) the motion vector information and (c) the terminal symbol, the single variable length code being selected from a variable length code table of different value combinations for the switch code, the motion vector information and the terminal symbol, wherein the terminal symbol indicates whether subsequent data for the set of pixels is to be output.

Claim 70 recites:

means for encoding an extended motion vector code for a set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the terminal symbol indicates whether subsequent data for the set of pixels is included in the encoded bit stream, and wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, the single variable length code being selected from a variable length code table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

For at least the reasons discussed above with regard to the above-cited language of claim 1, Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claims 5 and 70, respectively.

In addition, Machida and Kimura, separately or in combination, do not teach or suggest the language of jointly coding the additional "terminal symbol" as recited by claims 5 and 70. Regarding the "terminal symbol," the Examiner argues that, "As understood by the examiner, a terminal symbol represents the quantized coefficient, which is discloses in Machida (column 5 lines 10-15)." Action, page 2. Applicants respectfully disagree.

As discussed above (in the section titled "Reply to the 'Response to Arguments' Section in the Action"), col. 5, lines 10-15, of Machida describes decoding separate variable length codes for various elements, such as an intra/inter control signal, motion vector A, motion vector B, and quantized coefficients. However, there is no teaching or suggestion in Machida to jointly code such elements using a single variable length code. Furthermore, the claimed "terminal symbol" does not "represent the quantized coefficient" as argued by the Examiner. Instead, the claimed "terminal symbol" indicates whether additional information (such as transform coefficients) are present for the set of pixels (e.g., as claim 70 recites, "a terminal symbol, wherein the terminal symbol indicates *whether subsequent data for the set of pixels is included in the encoded bit*

stream" emphasis added).

Therefore claims 5 and 70 should be in condition for allowance.

Claims 48, 69, and 71

Claim 48 recites:

decoding an extended motion vector code for the set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a variable length code table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claim 69 recites:

means for decoding an extended motion vector code for a set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a variable length code table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claim 71 recites:

decoding an extended motion vector code for the set of pixels, wherein the extended motion vector code reflects joint encoding of motion vector information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion vector information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a variable length code table of different value combinations for the intra/inter decision information, the motion vector information and the terminal symbol.

For at least the reasons discussed above with regard to the above-cited language of claims 1, 5, and 70, Machida and Kimura, separately or in combination, do not teach or suggest the above-cited language of claims 48, 69, and 71, respectively. Therefore claims 48, 69, and 71 should be in condition for allowance.

Furthermore, regarding claim 48 (Action, page 5), the Examiner cites to columns and lines of a Machida that are not present in Machida (e.g., col. 12, lines 60-67 and col. 15). It appears that these cites are from the prior rejection using the Puri patent (see Dec. 12, 2008, Office action).

Claims 2, 3, 6, 11, 12, 51-53, 55, and 74-78

Each of dependent claims 2, 3, 6, 11, 12, 51-53, 55, and 74-78 depends directly or indirectly on one of claims 1, 5, 48 and 71 and, therefore, should also be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims

Rejections of Claims 4, 50, and 73 under 35 U.S.C. § 103

In the Office action, the Examiner rejects claims 4, 50, and 73 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Kimura patent and in further view of the Shimoda patent. The Applicants respectfully disagree.

Claim 4 depends on claim 1, claim 50 depends on claim 48, and claim 73 depends on claim 71. The Machida patent and the Kimura patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 1, 48, and 71, respectively. The Shimoda patent fails to remedy this deficiency of the rejections. Although the Shimoda patent describes variable length coding and decoding as part of video coding/decoding system, it does not address variable length coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting the joint coding or corresponding decoding recited in claims 1, 48, and 71, respectively.

For at least this reason, claims 4, 50, and 73 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Rejection of Claim 9 under 35 U.S.C. § 103

In the Office action, the Examiner rejects claim 9 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Sugimoto patent. The Applicants respectfully disagree.

Claim 9 depends on claim 1. The Machida patent and the Sugimoto patent, taken separately or in combination, fail to teach or suggest the above-cited language of claim 1. As

explained above with regard to claim 1, the Machida patent fails to teach or suggest the above-cited language of claim 1. The Sugimoto patent fails to remedy this deficiency of the rejection. Although the Sugimoto patent describes motion vector detection and compression, with an emphasis on different ways of performing motion vector detection, it does not detail coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting the joint coding language recited in claim 1.

For at least this reason, claim 9 should be allowable. The Applicants will not belabor the merits of the separate patentability of this dependent claim.

Rejections of Claims 49 and 72 U.S.C. § 103

In the Office action, the Examiner rejects claims 49 and 72 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Tsukagoshi publication. The Applicants respectfully disagree.

Claim 49 depends on claim 48, and claim 72 depends on claim 71. The Machida patent and the Tsukagoshi publication, taken separately or in combination, fail to teach or suggest the above-cited language of claims 48 and 71, respectively. As discussed above, the Machida patent fails to teach or suggest the above-cited language of claims 48 and 71, respectively. The Tsukagoshi publication fails to remedy this deficiency of the rejections. Although the Tsukagoshi publication describes aspects of a video decoding system, it does not address variable length coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting decoding of a code that reflects joint encoding as recited in claims 48 and 71, respectively.

For at least this reason, claims 49 and 72 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Rejections of Claims 65 and 66 under 35 U.S.C. § 103

In the Office action, the Examiner rejects claims 65 and 66 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of features "well-known in the art" according to the Examiner. The Applicants respectfully disagree.

As a threshold matter, the Applicants respectfully disagree with the Examiner's use of Official Notice in the rejections. In any case, each of claims 65 and 66 depends on claim 48. As

discussed above, the Machida patent fails to teach or suggest the above-cited language of claim 48. The features that the Examiner cites as being well-known in the art do not relate to variable length coding and decoding of motion information, and they are even further from teaching or suggesting decoding of a code that reflects joint encoding as recited in claim 48.

For at least this reason, claims 65 and 66 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Rejections of Claims 7, 8, 10, 54, 56-60, and 64 under 35 U.S.C. § 103

In the Office action, the Examiner rejects claims 7, 8, 10, 54, 56-60, and 64 under 35 U.S.C. § 103(a) as being unpatentable over the Machida patent in view of the Kimura patent and in further view of the Puri patent. The Applicants respectfully disagree.

Claims 7, 8, and 10 depend on claim 5, and claims 54, 56-60, and 64 depend on claim 48. The Machida patent and the Kimura patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 5 and 48, respectively. The Puri patent fails to remedy this deficiency of the rejections. Generally, the Puri patent describes (a) a block classification signal that includes an inter/intra coding type signal, (b) differential motion vector components and (c) a one-bit macroblock_code_nocode flag, but these elements are separately sent to an encoder and multiplexer for transmission as different syntax elements in an output bit stream.

For at least this reason, claims 7, 8, 10, 54, 56-60, and 64 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Interview Request

If the claims are not found by the Examiner to be allowable, the Examiner is requested to call the undersigned attorney to set up an interview to discuss this application.

Conclusion

The claims should be allowable. Such action is respectfully requested.

Respectfully submitted,

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